SOAP Interface for StarQuality

Reference Guide

Software Version: 2.0
September 2009
P/N 215402

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About this Manual

This document describes the obtaining of a specific measurement value for a specific device. This is actually only a part of the SOAP support, described in a larger document.

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1. Introduction

The StarQuality SOAP Northbound Interface (NBI) provides the means of extracting measurement data from the StarQuality Database by an upper level management system (OSS) or any relevant application. The upper level management system issues requests to StarQuality via the NBI, and the StarQuality server processes these requests and communicates the results.

The NBI is based on Web Services with XML/SOAP, supporting multiple simultaneous requests.

This document describes the obtaining of a specific measurement value for a specific device. This is actually only a part of the SOAP support, described in a larger document.

2. Sending SOAP Requests

StarQuality is able to receive a SOAP request in two ways:

- Through the separate server module **SOAP server**
- Through the Web using a specific CGI script

The SOAP server listens on the TCP port 8082 by default; This port can be changed in the configuration file using the `SOAP_LISTEN_PORT` parameter.

The server splits a new sub-process for every established connection, so the concurrent sessions do not block each other. As a result, the use of the SOAP server is faster than the CGI based interface (creation of a new process is unnecessary, and all the meta-data is already loaded). The authentication is based on the Authentication part of the SOAP Header which contains the username and password.

The authentication is based on the same Authentication part of the SOAP Header even when the request is received through the Web.

The SOAP requests are independent: every request creates a new transaction. This means that a modification made through the SOAP interface is immediately executed in the database (except when some error have occurred, in which case the whole transaction is rolled back).

3. WSDL File

The StarQuality Web Services Description Language (WSDL) document, *PVSR.WSDL*, can be obtained as follows:

- Downloaded from the StarQuality server, from the URL http://<name_of_the_server>/cgi-bin/soap_web.pl?WSDL
- In a StarQuality installation it can be found in the path: *opt**StarQuality**etc*

The NBI WSDL includes the URL by which to access the service and Web service. In order to make the WSDL file suitable for your specific environment, the following WSDL elements (appearing at the end of the document) must be modified:

```
<wsdl:service name="PerformanceVisor">
      <wsdl:port name="PerformanceVisorSoap"
binding="tns:PerformanceVisorSoap">
            <soap:address location="http://localhost:8082/"/>
      </wsdl:port>
 </wsdl:service>
```

Open the PVSR.WSDL file using a text editor and replace the string "`localhost`" with the IP address of your StarQuality server machine.

If the SOAP interface default port was changed from the default setting of 8082 (Refer to the *StarQuality User Manual*), change the port setting in the URL accordingly.

4. General Functionality

4.1 Authentication

The StarQuality SOAP server authentication is based on the authentication part of the SOAP Header which contains a username and password.

The username and password should be those of a user registered in the StarQuality server and with the required authorizations to view data regarding the inquired equipments or measurements.

Table 1: Authentication

Parameter	Description	Remark
Username	String complying to a StarQuality user	Mandatory
Password	String complying to a StarQuality user	Mandatory

Example:

```
<s0:Authentication xsi:type="s0:Authentication"
     xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
     xmlns:xs="http://www.w3.org/2001/XMLSchema"
     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
     xmlns:s0="PVSR_SOAP">
    <s0:Username xsi:type="xs:string">admin</s0:Username>
    <s0:Password xsi:type="xs:string">admin123</s0:Password>
</s0:Authentication>
```

4.2 Defining Output Characteristics

Each SOAP query includes definitions as to the characteristics of the output list. These definitions include the following:

Table 2: Parameters for Defining Output Characteristics

Parameter	Description	Remark
Maxsize	Max value of output result list	Use maxsize=0 for unlimited list size
addToWhere		

Example:

```
<soapenv:Body
soapenv:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
      <s0:listMeasurements
          xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
          xmlns:xs="http://www.w3.org/2001/XMLSchema"
          xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
          xmlns:s0="PVSR_SOAP">
         <filter xsi:type="s0:Measurement">
            <s0:Id xsi:type="xs:long" xsi:nil="true" />
            <s0:Type xsi:type="xs:string" xsi:nil="true" />
            <s0:Index xsi:type="xs:string" xsi:nil="true" />
            <s0:ParentId xsi:type="xs:long">61</s0:ParentId>
            <s0:DescriptionToShow xsi:type="xs:string" xsi:nil="true" />
            <s0:Description xsi:type="xs:string" xsi:nil="true" />
            <s0:Switched xsi:type="s0:YesNoType" xsi:nil="true" />
            <s0:RetainRawData xsi:type="xs:long" xsi:nil="true" />
            <s0:IntervalInSec xsi:type="xs:long" xsi:nil="true" />
            <s0:Peak xsi:type="s0:MeasurementPeakType" xsi:nil="true" />
            <s0:MaxPercent xsi:type="xs:long" xsi:nil="true" />
            <s0:Multiplier xsi:type="xs:long" xsi:nil="true" />
            <s0:Remark xsi:type="xs:string" xsi:nil="true" />
         </filter>
         <maxsize xsi:type="xs:long">5</maxsize>
         <addToWhere xsi:type="xs:string" />
      </s0:listMeasurements>
   </soapenv:Body>
```

5. Selected Objects and Operations

5.1 Introduction

The StarQuality SOAP interface includes various generic object types and operations.

This section details selected objects and operations which can be used in order to perform the required data collecting operations.

5.2 GenericEquipment

The GenericEquipment object and its inherited types represent every collector type in the StarQuality system.

5.2.1 Object Attributes

Table 3: GenericEquipment Object Attributes

Name	Type	Length	Search	Creation	Modification	Deletion	Default value
Id	xsd:long	10	Yes	No	Key	Yes	
Name	xsd:string	50	Order	Mandatory	Mandatory	No	
CollectorType	xsd:string	1	Yes	Mandatory	No	No	
ParentId	xsd:long	10	Yes	Mandatory	Mandatory	No	
Description	xsd:string	50	Yes	Yes	Yes	No	
Uptime	xsd:string	50	Yes	No	No	No	
RetainRawData	xsd:long	10	Yes	Yes	Yes	No	
CreatedBy	xsd:string	30	Yes	No	No	No	
CreatedTs	xsd:dateTime		Yes	No	No	No	
LastModBy	xsd:string	30	Yes	No	No	No	
LastModTs	xsd:dateTime		Yes	No	No	No	
IntervalInSec	xsd:long	10	Yes	Yes	Yes	No	300
Icon	xsd:string	250	Yes	Yes	Yes	No	icon_equip.png
CollectorGroup	xsd:long	10	Yes	Yes	Yes	No	
CollectorMember	xsd:long	10	Yes	No	No	No	
PreviousCollectorMember	xsd:long	10	Yes	No	No	No	
CollectorChgTs	xsd:dateTime		Yes	No	No	No	
CollectData	YesNoType		Yes	Yes	Yes	No	Yes

5.2.2 Operations: ListEquipments

Table 4: Operations: ListEquipments

Input parameters	filter	GenericEquipment
	maxsize	xsd:long
	addToWhere	xsd:string
Output parameters	list	GenericEquipments

The following example will return an unlimited sized list of equipments answering to a single filter criterion of equipment name = `10.10.182.201`.

```
<soapenv:Envelope
    xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
   <soapenv:Header>
      <s0:Authentication xsi:type="s0:Authentication"
          xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
          xmlns:xs="http://www.w3.org/2001/XMLSchema"
          xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
          xmlns:s0="PVSR_SOAP">
         <s0:Username xsi:type="xs:string">admin</s0:Username>
         <s0:Password xsi:type="xs:string">admin123</s0:Password>
      </s0:Authentication>
   </soapenv:Header>
   <soapenv:Body
soapenv:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
      <s0:listEquipments
          xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
          xmlns:xs="http://www.w3.org/2001/XMLSchema"
          xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
          xmlns:s0="PVSR_SOAP">
         <filter xsi:type="s0:GenericEquipment">
            <s0:Id xsi:type="xs:long" xsi:nil="true" />
            <s0:Name xsi:type="xs:string">10.10.182.201</s0:Name>
            <s0:CollectorType xsi:type="xs:string" xsi:nil="true" />
            <s0:ParentId xsi:type="xs:long" xsi:nil="true" />
            <s0:Description xsi:type="xs:string" xsi:nil="true" />
            <s0:Uptime xsi:type="xs:string" xsi:nil="true" />
            <s0:RetainRawData xsi:type="xs:long" xsi:nil="true" />
            <s0:CreatedBy xsi:type="xs:string" xsi:nil="true" />
            <s0:CreatedTs xsi:type="xs:dateTime" xsi:nil="true" />
            <s0:LastModBy xsi:type="xs:string" xsi:nil="true" />
            <s0:LastModTs xsi:type="xs:dateTime" xsi:nil="true" />
            <s0:IntervalInSec xsi:type="xs:long" xsi:nil="true" />
            <s0:Icon xsi:type="xs:string" xsi:nil="true" />
            <s0:CollectorGroup xsi:type="xs:long" xsi:nil="true" />
            <s0:CollectorMember xsi:type="xs:long" xsi:nil="true" />
            <s0:PreviousCollectorMember xsi:type="xs:long" xsi:nil="true" />
```

```
            <s0:CollectorChgTs xsi:type="xs:dateTime" xsi:nil="true" />
            <s0:CollectData xsi:type="s0:YesNoType" xsi:nil="true" />
         </filter>
         <maxsize xsi:type="xs:long">0</maxsize>
         <addToWhere xsi:type="xs:string" />
      </s0:listEquipments>
   </soapenv:Body>
</soapenv:Envelope>
```

5.3 Measurements

The measurement object represents the generic StarQuality measurements.

5.3.1 Object Attributes

Table 5: Measurements Object Attributes

Name	Type	Length	Search	Creation	Modification	Deletion	Default value
Id	xsd:long	10	Yes	No	Key	Yes	
Type	xsd:string	5	Yes	Mandatory	No	No	
Index	xsd:string	1000	Yes	Mandatory	Mandatory	No	
ParentId	xsd:long	10	Order	Mandatory	No	No	
DescriptionToShow	xsd:string	3000	Order	Mandatory	Mandatory	No	
Description	xsd:string	3000	Yes	Yes	Yes	No	
Switched	YesNoType		Yes	Yes	Yes	No	No
RetainRawData	xsd:long	5	Yes	Yes	Yes	No	
IntervalInSec	xsd:long	5	Yes	Mandatory	Yes	No	
Peak	Measurement PeakType		Yes	Yes	Yes	No	
MaxPercent	xsd:long	3	Yes	Yes	Yes	No	
Multiplier	xsd:long	10	Yes	Yes	Yes	No	
Remark	xsd:string	255	Yes	Yes	Yes	No	
Parameter	Parameter array		No	Yes	Yes	No	

5.3.2 Operations: ListMeasurements

Table 6: Operations: ListMeasurements

Input parameters	filter	Measurement
	maxsize	xsd:long
	addToWhere	xsd:string
Output parameters	list	Measurements

The following example will return a result list up to 5 members long of the existing measurements according to a single filtering criterion of equipment parent id = 61.

```
<soapenv:Envelope
    xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
   <soapenv:Header>
      <s0:Authentication xsi:type="s0:Authentication"
          xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
          xmlns:xs="http://www.w3.org/2001/XMLSchema"
          xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
          xmlns:s0="PVSR_SOAP">
         <s0:Username xsi:type="xs:string">admin</s0:Username>
         <s0:Password xsi:type="xs:string">admin123</s0:Password>
      </s0:Authentication>
   </soapenv:Header>
   <soapenv:Body soapenv:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
      <s0:listMeasurements
          xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
          xmlns:xs="http://www.w3.org/2001/XMLSchema"
          xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
          xmlns:s0="PVSR_SOAP">
         <filter xsi:type="s0:Measurement">
            <s0:Id xsi:type="xs:long" xsi:nil="true" />
            <s0:Type xsi:type="xs:string" xsi:nil="true" />
            <s0:Index xsi:type="xs:string" xsi:nil="true" />
            <s0:ParentId xsi:type="xs:long">61</s0:ParentId>
            <s0:DescriptionToShow xsi:type="xs:string" xsi:nil="true" />
            <s0:Description xsi:type="xs:string" xsi:nil="true" />
            <s0:Switched xsi:type="s0:YesNoType" xsi:nil="true" />
            <s0:RetainRawData xsi:type="xs:long" xsi:nil="true" />
            <s0:IntervalInSec xsi:type="xs:long" xsi:nil="true" />
            <s0:Peak xsi:type="s0:MeasurementPeakType" xsi:nil="true" />
            <s0:MaxPercent xsi:type="xs:long" xsi:nil="true" />
            <s0:Multiplier xsi:type="xs:long" xsi:nil="true" />
            <s0:Remark xsi:type="xs:string" xsi:nil="true" />
         </filter>
         <maxsize xsi:type="xs:long">5</maxsize>
         <addToWhere xsi:type="xs:string" />
      </s0:listMeasurements>
   </soapenv:Body>
</soapenv:Envelope>
```

6. GetMeasuredValuesInput

This object is used to pass the required parameters to the various GetMeasurement values operations.

6.1 Object Attributes

Table 7: GetMeasuredValuesInput Object Attrubutes

Name	Type
ObjId	xsd:long
From	xsd:dateTime
To	xsd:dateTime

6.2 Operations: getMeasuredValues

This method returns the measured values for a specific measurement, similar to the Export to XLS functionality on the GUI. The MeasuredValues object contains a ColumnCount attribute which determines the number of values in the array that follows it.

For large amounts of data the usage of the bulk export GUI utility is recommended rather than SOAP operation (refer to the *StarQuality User Manual*).

Table 8: Operations: getMeasuredValues

Input parameters	input	GetMeasuredValuesInput
Output parameters	list	MeasuredValues

The following example returns an unlimited list of results for measurement with ID = 543 from time = 2009-06-13T11:58:37.000Z to time = 2009-06-14T08:58:29.384Z

```
<soapenv:Envelope
    xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
   <soapenv:Header>
      <s0:Authentication xsi:type="s0:Authentication"
          xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
          xmlns:xs="http://www.w3.org/2001/XMLSchema"
          xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
          xmlns:s0="PVSR_SOAP">
         <s0:Username xsi:type="xs:string">admin</s0:Username>
         <s0:Password xsi:type="xs:string">admin123</s0:Password>
      </s0:Authentication>
```

```
   </soapenv:Header>
   <soapenv:Body
soapenv:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
      <s0:getMeasuredValues
          xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
          xmlns:xs="http://www.w3.org/2001/XMLSchema"
          xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
          xmlns:s0="PVSR_SOAP">
         <input xsi:type="s0:GetMeasuredValuesInput">
            <s0:ObjType
xsi:type="s0:MeasuredValuesType">Measurement</s0:ObjType>
            <s0:ObjId xsi:type="xs:long">543</s0:ObjId>
            <s0:From
xsi:type="xs:dateTime">2009-06-13T11:58:37.000Z</s0:From>
            <s0:To xsi:type="xs:dateTime">2009-06-14T08:58:29.384Z</s0:To>
         </input>
      </s0:getMeasuredValues>
   </soapenv:Body>
</soapenv:Envelope>
```

7. Performing SOAP Queries

7.1 Introduction

Due to the generic characteristic of the objects and methods in the SOAP interface, the most required operations should be performed in several steps.

7.2 Quering a Specific Measurement for Specific Equipment

1 Step 1 - `listEquipments`

Table 9: listEquipments

Input data	GenericEquipment object with a single parameter – Required equipment name as it is set (and is unique) in StarQuality system and viewable in the GUI	Examples: SU - SU 00-10-E7-62-1E-96 BTS -10.10.184.1
Output data	A list of GenericEquipment objects with one member. relevant attribute: ID	

2 Step 2 – `listMeasurements`

Table 10: listMeasurements

Input data	Measurement object with 2 parameters – ■ ParentId – use the Id retrieved in step 1 ■ DescriptionToShow – according to equipment type, choose from the values detailed in appendix A
Output data	A list of measurement objects with a single member. Relevant attribute: ID

3 Step 3 – `getMeasuredValues`

Table 11: getMeasuredValues

Input data	getMeasuredValuesInput with the following parameters: ■ ObjId – use the Id retrieved in step 2 ■ From – start date ■ To – end date
Output data	List of measured values. Length of list is according to the time span selected – value per 15 minutes.

8. Appendix – DescriptionToShow Values

`DescriptionToShow` values for WiMAX Equipment.

The following lists detail WiMAX measurement names (DescriptionToShow values) according to equipment type.

8.1 FDD/TDD AU

Each string should be headed by the required Slot number according to the required AU.

Example: Slot 3 Air Link Utilization

- Air Link Utilization
- CIR Allocated
- MIR+CIR Allocated
- Number Of Connected SUs

- Subscription
- Throughput
- Total Used Capacity Rate 1 (BPSK 1/2)
- Total Used Capacity Rate 2 (BPSK 3/4)
- Total Used Capacity Rate 3 (QPSK 1/2)
- Total Used Capacity Rate 4 (QPSK 3/4
- Total Used Capacity Rate 5 (16QAM 1/2)
- Total Used Capacity Rate 6 (16QAM 3/4)
- Total Used Capacity Rate 7 (64QAM 2/3)
- Total Used Capacity Rate 8 (64QAM 3/4)

8.2 4Motion BS

Each string should be headed by the required bs name as it appears in the StarQuality system.

Example: BS 9.9.9 Air Link Utilization All

- Average Sector Throughput
- Average Spectral Efficiency all MSs
- DL Air Link Utilization, Data Zone
- DL Air Link Utilization, Map Zone
- UL Air Link Utilization, Data Zone
- UL Air Link Utilization, Feedback Zone
- Air Link Utilization All
- DL Retransmission, Zero Retransmission

- DL Retransmission, One Retransmission
- DL Retransmission, Two Retransmissions
- DL Retransmission, Three Retransmissions
- DL Retransmission, Four Retransmissions
- DL Retransmission, Above Four Retransmissions
- DL SINR Distribution, SINR < 5dB
- DL SINR Distribution, SINR 5dB till 9dB
- DL SINR Distribution, SINR 11dB till 13dB
- DL SINR Distribution, SINR 15dB till 17dB
- DL SINR Distribution, SINR 19dB till 21dB
- DL SINR Distribution, SINR 23dB till 25dB
- UL SINR Distribution, SINR 13dB till 17dB
- UL SINR Distribution, SINR 17dB till 21dB
- UL SINR Distribution, SINR 5dB till 9dB
- UL SINR Distribution, SINR 9dB till 13dB
- UL SINR Distribution, SINR < 5dB
- UL SINR Distribution, SINR > 21dB
- HARQ Packet Error Rate PER 16QAM 1/2
- HARQ Packet Error Rate PER 16QAM 3/4
- HARQ Packet Error Rate PER 64QAM 1/2
- HARQ Packet Error Rate PER 64QAM 2/3

- HARQ Packet Error Rate PER 64QAM 3/4
- HARQ Packet Error Rate PER 64QAM 5/6
- HARQ Packet Error Rate PER QPSK 1/2
- HARQ Packet Error Rate PER QPSK 1/2 Rep 2
- HARQ Packet Error Rate PER QPSK 1/2 Rep 4
- HARQ Packet Error Rate PER QPSK 1/2 Rep 6
- HARQ Packet Error Rate PER QPSK 3/4
- HARQ Packet Error Rate Percent
- MAP Length Two Symbols
- MAP Length Four Symbols
- MAP Length Six Symbols
- MAP Length Eight Symbols
- MAP Length Ten Symbols
- MAP Length More Than Ten Symbols
- MCS Distribution 16QAM 1/2
- MCS Distribution 16QAM 3/4
- MCS Distribution 64QAM 1/2
- MCS Distribution 64QAM 2/3
- MCS Distribution 64QAM 3/4
- MCS Distribution 64QAM 5/6
- MCS Distribution QPSK 1/2

- MCS Distribution QPSK 1/2 Rep 2
- MCS Distribution QPSK 1/2 Rep 4
- MCS Distribution QPSK 1/2 Rep 6
- MCS Distribution QPSK 3/4
- Max Spectral Efficiency all MSs
- Number Of Connected SUs
- UL Noise (99th Percentile)
- UL Noise (Median)

8.3 FDD TFTP SU

- SU RATE AVERAGE
- SU RATE MAX
- SU RATE MIN
- SU RSSI AVERAGE
- SU RSSI MAX
- SU RSSI MIN
- SU SNR AVERAGE
- SU SNR MAX
- SU SNR MIN

8.4 TDD SU

- SU RATE AVERAGE
- SU RATE MAX

- SU RATE MIN
- SU RSSI AVERAGE
- SU SNR MAX
- SU SNR AVERAGE
- SU SNR MIN

8.5 4Motion SU

- CINR Downlink
- CINR Uplink
- MCS Downlink
- MCS Uplink
- RSSI Uplink
- Average Spectral Efficiency

9. Abbreviations and Terms

Table 12: Abbreviations and Terms

Item	Description
ACS	Automatic configuration server
BS	Base station (either BS-SH or μBS)
DHCP	Dynamic Host Configuration Protocol. A protocol that is used for the dynamic allocation of IP addresses.
IP	Internet Protocol
LAN	Local Area Network
μBS	Micro Base Station
NPU	Network Processing Unit
RF	Radio Frequency

Table 12: Abbreviations and Terms

Item	Description
SU	BreezeMAX Subscriber Unit
SW	Software (refers to the Firmware version of the units)